

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: Chatterjee, Deb K.
- (ii) TITLE OF INVENTION: Mutant DNA Polymerases and Uses Thereof
- (iii) NUMBER OF SEQUENCES: 43
- (iv) CORRESPONDENCE ADDRESS:
- (A) ADDRESSEE: STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
 - (B) STREET: 1100 New York Avenue, N.W., Suite 600
 - (C) CITY: Washington
 - (D) STATE: DC
 - (E) COUNTRY: USA
 - (F) ZIP: 20005
- (v) COMPUTER READABLE FORM:
- (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.30
- (vi) CURRENT APPLICATION DATA:
- (A) APPLICATION NUMBER: (To Be Assigned)
 - (B) FILING DATE: (Herewith)
 - (C) CLASSIFICATION:
- (vii) PRIOR APPLICATION DATA:
- (A) APPLICATION NUMBER: US 08/525,057
 - (B) FILING DATE: 08-SEP-1995
- (vii) PRIOR APPLICATION DATA:
- (A) APPLICATION NUMBER: US 08/537,397
 - (B) FILING DATE: 02-OCT-1995
- (viii) ATTORNEY/AGENT INFORMATION:
- (A) NAME: Esmond, Robert W.
 - (B) REGISTRATION NUMBER: 32,893
 - (C) REFERENCE/DOCKET NUMBER: 0942.3600002
- (ix) TELECOMMUNICATION INFORMATION:
- (A) TELEPHONE: 202-371-2600
 - (B) TELEFAX: 202-371-2540

(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 40 base pairs

09558421.042600

- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: both
- (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

CAGGATCCAC ATGGTGCTTA ACGGCGACAT CCACACTAAG

40

(2) INFORMATION FOR SEQ ID NO:2:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 27 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: both
 - (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

GTAACTTCT TGTGCGGTCT CAATGAC

27

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 11 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

Ala	Lys	Ala	Ile	Thr	Phe	Gly	Ile	Leu	Tyr	Gly
1				5					10	

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 11 amino acids

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

(2) INFORMATION FOR SEQ ID NO:5:

(ii) MOLECULE TYPE: protein.

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly
1 5 10

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: not relevant

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Thr Phe Ile Tyr
1

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Ala Ile Thr Phe
1

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Thr Ile Asn Phe
1

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(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 45 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

TCAGGCTGCT AAAACATTCA TCTACGGTAT ACTGTATGGT TCTGG

45

(2) INFORMATION FOR SEQ ID NO:11:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 33 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

GTAGAGGACC CCGTAATTAA TGGTCTTGGC CGC

33

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly
1 5 10

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(2) INFORMATION FOR SEQ ID NO:13:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Met Val Asn Phe
1

(2) INFORMATION FOR SEQ ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 694 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: double
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: DNA (genomic)

- (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 2..694

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

G GAT CCA GAC TGG TGG ATC GTC AGT GCG GAT TAT TCC CAA ATA GAA	46
Asp Pro Asp Trp Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu	
1 5 10 15	
CTC AGA ATC CTC GCT CAT CTC AGT GGT GAT GAG AAC CTT GTG AAG GCC	94
Leu Arg Ile Leu Ala His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala	
20 25 30	
TTC GAG GAG GGC ATC GAT GTG CAC ACC TTG ACT GCC TCC AGG ATC TAC	142
Phe Glu Glu Gly Ile Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr	
35 40 45	
AAC GTA AAG CCA GAA GAA GTG AAC GAA GAA ATG CGA CGG GTT GGA AAG	190
Asn Val Lys Pro Glu Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys	
50 55 60	

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ATG GTG AAC TTC TCT ATA ATA TAC GGT GTC ACA CCG TAC GGT CTT TCT	238
Met Val Asn Phe Ser Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser	
65 70 75	
GTG AGA CTT GGA ATA CCG GTT AAA GAA GCA GAA AAG ATG ATT ATC AGC	286
Val Arg Leu Gly Ile Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser	
80 85 90 95	
TAT TTC ACA CTG TAT CCA AAG GTG CGA AGC TAC ATC CAG CAG GTT GTT	334
Tyr Phe Thr Leu Tyr Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val	
100 105 110	
GCA GAG GCA AAA GAG AAG GGC TAC GTC AGG ACT CTC TTT GGA AGA AAA	382
Ala Glu Ala Lys Glu Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys	
115 120 125	
AGA GAT ATT CCC CAG CTC ATG GCA AGG GAC AAG AAC ACC CAG TCC GAA	430
Arg Asp Ile Pro Gln Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu	
130 135 140	
GGC GAA AGA ATC GCA ATA AAC ACC CCC ATT CAG GGA ACT GCG GCA GAT	478
Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp	
145 150 155	
ATA ATA AAA TTG GCT ATG ATA GAT ATA GAC GAG GAG CTG AGA AAA AGA	526
Ile Ile Lys Leu Ala Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg	
160 165 170 175	
AAC ATG AAA TCC AGA ATG ATC ATT CAG GTT CAT GAC GAA CTG GTC TTC	574
Asn Met Lys Ser Arg Met Ile Ile Gln Val His Asp Glu Leu Val Phe	
180 185 190	
GAG GTT CCC GAT GAG GAA AAA GAA GAA CTA GTT GAT CTG GTG AAG AAC	622
Glu Val Pro Asp Glu Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn	
195 200 205	
AAA ATG ACA AAT GTG GTG AAA CTC TCT GTG CCT CTT GAG GTT GAC ATA	670
Lys Met Thr Asn Val Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile	
210 215 220	
AGC ATC GGA AAA AGC TGG TCT TGA	694
Ser Ile Gly Lys Ser Trp Ser	
225 230	

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 230 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Asp Pro Asp Trp Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu
1 5 10 15
Arg Ile Leu Ala His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe
20 25 30
Glu Glu Gly Ile Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn
35 40 45
Val Lys Pro Glu Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met
50 55 60
Val Asn Phe Ser Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val
65 70 75 80
Arg Leu Gly Ile Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr
85 90 95
Phe Thr Leu Tyr Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala
100 105 110
Glu Ala Lys Glu Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg
115 120 125
Asp Ile Pro Gln Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly
130 135 140
Glu Arg Ile Ala Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile
145 150 155 160
Ile Lys Leu Ala Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn
165 170 175
Met Lys Ser Arg Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu
180 185 190
Val Pro Asp Glu Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys
195 200 205
Met Thr Asn Val Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser
210 215 220
Ile Gly Lys Ser Trp Ser
225 230

(2) INFORMATION FOR SEQ ID NO:16:

00558421-042600

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 31 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

GTATATTATA GAGTAGTTAA CCATCTTTCC A

31

(2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 26 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

GACGTTTCAA GCGCTAGGGC AAAAGA

26

(2) INFORMATION FOR SEQ ID NO:18:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly
 1 5 10

(2) INFORMATION FOR SEQ ID NO:19:

00558431.042600

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 24 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Gly Ser Arg Leu Val Asp Arg Gln Cys Gly Leu Phe Pro Asn Arg Thr
 1 5 10 15
 Gln Asn Pro Arg Ser Ser Gln Trp
 20

(2) INFORMATION FOR SEQ ID NO:20:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 60 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Glu Pro Cys Glu Gly Leu Arg Gly Gly His Arg Cys Ala His Leu Asp
 1 5 10 15
 Cys Leu Gln Asp Leu Gln Arg Lys Ala Arg Arg Ser Glu Arg Arg Asn
 20 25 30
 Ala Thr Gly Trp Lys Asp Gly Glu Leu Leu Tyr Asn Ile Arg Cys His
 35 40 45
 Thr Val Arg Ser Phe Cys Glu Thr Trp Asn Thr Gly
 50 55 60

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 99 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single

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(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Arg Ser Arg Lys Asp Asp Tyr Gln Leu Phe His Thr Val Ser Lys Gly
1 5 10 15

Ala Lys Leu His Pro Ala Gly Cys Cys Arg Gly Lys Arg Glu Gly Leu
20 25 30

Arg Gln Asp Ser Leu Trp Lys Lys Lys Arg Tyr Ser Pro Ala His Gly
35 40 45

Lys Gly Gln Glu His Pro Val Arg Arg Arg Lys Asn Arg Asn Lys His
50 55 60

Pro His Ser Gly Asn Cys Gly Arg Tyr Asn Lys Ile Gly Tyr Asp Arg
65 70 75 80

Tyr Arg Arg Gly Ala Glu Lys Lys Lys His Glu Ile Gln Asn Asp His
85 90 95

Ser Gly Ser

(2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 8 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Arg Thr Gly Leu Arg Gly Ser Arg
1 5

(2) INFORMATION FOR SEQ ID NO:23:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 6 amino acids

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- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Gly Lys Arg Arg Thr Ser
1 5

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 16 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Ser Gly Glu Glu Gln Asn Asp Lys Cys Gly Glu Thr Leu Cys Ala Ser
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 9 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

His Lys His Arg Lys Lys Leu Val Leu
1 5

(2) INFORMATION FOR SEQ ID NO:26:

00558421.042600

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 13 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Ile Gln Thr Gly Gly Ser Ser Val Arg Ile Ile Pro Lys
1 5 10

(2) INFORMATION FOR SEQ ID NO:27:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 14 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Asn Ser Glu Ser Ser Leu Ile Ser Val Val Met Arg Thr Leu
1 5 10

(2) INFORMATION FOR SEQ ID NO:28:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

Arg Pro Ser Arg Arg Ala Ser Met Cys Thr Pro
1 5 10

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(2) INFORMATION FOR SEQ ID NO:29:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 7 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Leu Pro Pro Gly Ser Thr Thr
1 5

(2) INFORMATION FOR SEQ ID NO:30:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

Ser Gln Lys Lys
1

(2) INFORMATION FOR SEQ ID NO:31:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 10 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Thr Lys Lys Cys Asp Gly Leu Glu Arg Trp
1 5 10

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(2) INFORMATION FOR SEQ ID NO:32:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 10 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

Tyr Thr Val Ser His Arg Thr Val Phe Leu
1 5 10

(2) INFORMATION FOR SEQ ID NO:33:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

Asp Leu Glu Tyr Arg Leu Lys Lys Gln Lys Arg
1 5 10

(2) INFORMATION FOR SEQ ID NO:34:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 56 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

Leu Ser Ala Ile Ser His Gly Ile Gln Arg Cys Glu Ala Thr Ser Ser

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1 5 10 15
 Arg Leu Leu Gln Arg Gln Lys Arg Arg Ala Thr Ser Gly Leu Ser Leu
 20 25 30
 Glu Glu Lys Glu Ile Phe Pro Ser Ser Trp Gln Gly Thr Arg Thr Pro
 35 40 45
 Ser Pro Lys Ala Lys Glu Ser Gln
 50 55

(2) INFORMATION FOR SEQ ID NO:35:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 10 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

Thr Pro Pro Phe Arg Glu Leu Arg Gln Ile
 1 5 10

(2) INFORMATION FOR SEQ ID NO:36:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 4 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

Glu Lys Glu Thr
 1

(2) INFORMATION FOR SEQ ID NO:37:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 19 amino acids
 - (B) TYPE: amino acid

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- (C) STRANDEDNESS: single
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

Ser Phe Arg Phe Met Thr Asn Trp Ser Ser Arg Phe Pro Met Arg Lys
1 5 10 15

Lys Lys Asn

(2) INFORMATION FOR SEQ ID NO:38:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 9 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

Asn Ser Leu Cys Leu Leu Arg Leu Thr
1 5

(2) INFORMATION FOR SEQ ID NO:39:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

Ala Ser Glu Lys Ala Gly Leu
1 5

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(2) INFORMATION FOR SEQ ID NO:40:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser
1 5 10

(2) INFORMATION FOR SEQ ID NO:41:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

Pro Tyr Phe Ala Phe Asp Thr Glu Thr Asp Ser
1 5 10

(2) INFORMATION FOR SEQ ID NO:42:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

Gly Pro Val Ala Phe Asp Ser Glu Thr Ser Ala
1 5 10

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(2) INFORMATION FOR SEQ ID NO:43:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 10 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

Met Ile Val Ser Asp Ile Glu Ala Asn Ala
1 5 10

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